



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/021,373	10/22/2001	Harald Berger	003015.098149	7250
29540	7590	03/30/2006		
PITNEY HARDIN LLP 7 TIMES SQUARE NEW YORK, NY 10036-7311			EXAMINER MCNELIS, KATHLEEN A	
			ART UNIT 1742	PAPER NUMBER
DATE MAILED: 03/30/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/021,373	Applicant(s) BERGER ET AL.	
	Examiner Kathleen A. McNelis	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Feb 27, 2006.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-32 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 16-32 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claims Status

Claims 16-32 remain for examination wherein claims 16, 31 and 32 are amended.

Status of Previous Rejections

The previous rejections of claims 16-32 under 35 USC 103(a) are withdrawn in view of applicants' amendment of claims.

The previous rejection of claim 31 under 35 USC 112 is withdrawn in view of applicants' amendment of the claim.

Claim Objections

Claim 32 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 16. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 16-25, 28, 29, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berger et al. (U.S. Pat. No. 5,835,524) in view of Eichberger et al. (U.S. Pat. No. 6,524,362).

The applied reference Eichberger et al. (U.S. Pat. No. 6,524,362) has a common inventorship and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

With respect to claims 16 and 32 Berger et al. ('524) discloses in claim 1 a method of melting scrap and sponge iron in the interior of an electric arc furnace wherein a charging shaft is disclosed centrally above the furnace and the electrodes are arranged in radial symmetry and directed obliquely into the furnace interior and directed towards the center of the furnace. While not specifically disclosed by Berger et al., one of ordinary skill in the art would expect a slag

Art Unit: 1742

layer to form and float on top of the molten metal. Oxygen is charged through nozzles in the side walls (col. 4 lines 43-56), which will provide mixing of the slag metal melt.

Berger et al. does not disclose that the metal is conveyed directly into a central region of the melting furnace through at least one charging tube having an opening dipping permanently into the slag layer.

Eichberger et al. discloses a method for feeding direct reduced iron into an electric arc furnace where the DRI (i.e. sponge iron) is fed by gravity through at least one lance into the slag layer (abstract and Fig. 1). The metal feeding lance is positioned and controlled during melting so that "...the lance aperture is always kept inside the foamy slag layer, so that no DRI is entrained to the roof of the furnace by ascending gases" (col. 2, lines 1-13). Eichberger et al. teaches injection of gases to the slag layer and melt (col. 2, lines 14-32), which will also mix the slag metal melt. It would have been obvious to one of ordinary skill in the art at the time the invention was made to position a metal feed lance within the slag layer as taught by Eichberger et al. in the electric arc furnace of Berger et al. to prevent DRI from becoming entrained in ascending gases as taught by Eichberger et al.

With respect to claim 17, the energy applied by the electrode configuration shown in Berger et al. Fig. 6 would result in applying energy in a location proximate to the opening of the charge tube of Eichberger et al. With respect to claim 18, Eichberger et al. discloses that either fine particulate or lumpy iron may be fed (Col. 1 lines 30-42).

With respect to claims 19 and 20, Eichberger et al. discloses transfer of hot feed (DRI from reduction plant) at temperatures of 300 to 1000 °C (Col. 3, lines 25-28). The range of 300 to 1000 °C overlaps the range of between 500 to 1000 °C in instant claim 19. It would have been

Art Unit: 1742

obvious to one of ordinary skill in the art at the time the invention was made to feed hot DRI into the furnace of Berger et al. in view of Eichberger et al. at a temperature of between 500 to 1000 °C, because Eichberger et al. teaches that any temperature between 300 to 1000 °C is suitable.

The range of 300 to 1000 °C overlaps the range of between 600 to 700 °C in instant claim 20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to feed hot DRI into the furnace of Berger et al. in view of Eichberger et al. at a temperature of between 600 to 700 °C, because Eichberger et al. teaches that any temperature between 300 to 1000 °C is suitable.

Eichberger et al. teaches that the slag layer in the method of Berger et al. in view of Eichberger et al. is foamed (Eichberger et al. col. 2 lines 14-21) as in instant claim 21. Gaseous oxygen is applied to the slag layer to form the foamed slag (Eichberger et al. col. 2 lines 14-21) as in instant claim 22. Fine grained carbon is added to the slag in the presence of oxygen to foam the slag (Eichberger et al. col. 2 lines 14-21) as in instant claim 23.

Eichberger et al. discloses that the metal material is introduced to the furnace of Berger et al. in view of Eichberger et al. solely by gravity (Eichberger et al. col. 1 lines 35-40) as in instant claim 24. The feed tube is positioned to keep the aperture always within the foamy slag layer (Eichberger et al. col. 2, lines 5-15), which is a function of the feed rate since this is a factor in determining the height of the melt inside the furnace, as in instant claim 25. With respect to claim 28, natural gas is fed to the furnace, forming a mixture of CO and H₂ that rises into the furnace, and an oxygen-fuel gas mixture is fed for afterburning (col. 10, lines 56-65).

Art Unit: 1742

The feeding method taught by Eichberger et al. is continuous (Eichberger et al. col. 1, lines 59-65) as in instant claim 29. The furnace of Berger et al. in view of Eichberger et al. is water cooled (Berger et al. Col. 5 lines 45-67 and col. 4 lines 9-24) as in instant claim 31.

Claims 16-25, 28, 29, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichberger et al. (U.S. Pat. No. 6,524,362) in view of Berger et al. (U.S. Pat. No. 5,835,524).

The applied reference Eichberger et al. (U.S. Pat. No. 6,524,362) has a common inventorship and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Eichberger et al. discloses in claim 1 a process of melting fine-grained direct reduced iron (DRI) in an electric arc furnace by injection the iron into a foamy slag layer (col. 4 lines 25-42).

Eichberger et al. does not disclose that the electric arcs are directed obliquely against the central region of the furnace thereby forming an energy center in the region of the lower end of the charging tube to provide a surplus amount of energy for melting the metal-contained material.

Berger et al. ('524) discloses in claim 1 a method of melting scrap and sponge iron in the interior of an electric arc furnace wherein a charging shaft is disclosed centrally above the furnace and the electrodes are arranged in radial symmetry and directed obliquely into the furnace interior and directed towards the center of the furnace. While not specifically disclosed by Berger et al., one of ordinary skill in the art would expect a slag layer to form and float on top of the molten metal. Oxygen is charged through nozzles in the side walls (col. 4 lines 43-56), which will provide mixing of the slag metal melt. Berger et al. teaches that this produces a very flat electric arc in the furnace interior which impinges directly on the feed material and avoids damaging the furnace side walls (col. 2 lines 42-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electrode positioning of Berger et al. in the furnace of Eichberger et al. to benefit from directing energy to the feed material while avoiding sidewall damage as taught by Berger et al.

With respect to claim 17, the energy applied by the electrode configuration shown in Berger et al. Fig. 6 would result in applying energy in a location proximate to the opening of the

Art Unit: 1742

charge tube of Eichberger et al. With respect to claim 18, Eichberger et al. discloses that either fine particulate or lumpy iron may be fed (Col. 1 lines 30-42).

With respect to claims 19 and 20, Eichberger et al. discloses transfer of hot feed (DRI from reduction plant) at temperatures of 300 to 1000 °C (Claim 3 and Col. 3, lines 25-28). The range of 300 to 1000 °C overlaps the range of between 500 to 1000 °C in instant claim 19. It would have been obvious to one of ordinary skill in the art at the time the invention was made to feed hot DRI into the furnace of Eichberger et al. in view of Berger et al. at a temperature of between 500 to 1000 °C, because Eichberger et al. teaches that any temperature between 300 to 1000 °C is suitable.

The range of 300 to 1000 °C overlaps the range of between 600 to 700 °C in instant claim 20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to feed hot DRI into the furnace of Eichberger et al. in view Berger et al. at a temperature of between 600 to 700 °C, because Eichberger et al. teaches that any temperature between 300 to 1000 °C is suitable.

Eichberger et al. teaches that the slag layer in the method of Eichberger et al. in view of Berger et al. is foamed (Eichberger et al. col. 2 lines 14-21) as in instant claim 21. Gaseous oxygen is applied to the slag layer to form the foamed slag (Eichberger et al. col. 2 lines 14-21) as in instant claim 22. Fine grained carbon is added to the slag in the presence of oxygen to foam the slag (Eichberger et al. col. 2 lines 14-21) as in instant claim 23.

Eichberger et al. discloses that the metal material is introduced to the furnace of Eichberger et al. in view of Berger et al. (Eichberger et al. col. 1 lines 35-40) as in instant claim 24. The feed tube is positioned to keep the aperture always within the foamy slag layer

(Eichberger et al. col. 2, lines 5-15), which is a function of the feed rate since this is a factor in determining the height of the melt inside the furnace, as in instant claim 25. With respect to claim 28, natural gas is fed to the furnace, forming a mixture of CO and H₂ that rises into the furnace, and an oxygen-fuel gas mixture is fed for afterburning (col. 10, lines 56-65).

The feeding method taught by Eichberger et al. is continuous (Eichberger et al. col. 1, lines 59-65) as in instant claim 29. The furnace of Eichberger et al. in view of Berger et al. is water cooled (Berger et al. Col. 5 lines 45-67 and col. 4 lines 9-24) as in instant claim 31.

Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berger et al. (U.S. Pat. No. 5,835,524) in view of Eichberger et al. (U.S. Pat. No. 6,524,362), or Eichberger et al. (U.S. Pat. No. 6,524,362) in view of Berger et al. (U.S. Pat. No. 5,835,524) as applied to claim 16 and further in view of Usher et al. (U.S. Pat. No. 5,827,474).

Berger et al. in view of Eichberger et al. discloses a method of introducing DRI feed into a foaming slag layer by use of a feeding tube as described above.

Berger et al. in view of Eichberger et al. does not specifically teach using an electrically conductive feed tube, providing a voltage measurement device and positioning the charging tube in the slag as a function of voltage measured by the voltage measurement device.

Usher et al. discloses the use of a voltmeter and electrically conductive probe for measuring the depth of molten steel and slag in an electric furnace, wherein the probe may be formed as a tube (abstract). Usher et al. teaches that this device can accurately measure the depth of the layer of slag (col. 2, lines 23-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an electrically conductive tube and voltage meter as taught by Usher et al. in the process of Berger et al. in view of Eichberger et al.,

since the method of Berger et al. in view of Eichberger et al. requires placement of feed into a slag layer (Eichberger et al. col. 2, lines 1-14) and Usher et al. teaches that this method accurately measures the depth of slag (Usher et al., col. 2, lines 23-27) as in claim 26.

With respect to claim 27, the process of Berger et al. in view of Eichberger et al. and in further view of Usher et al. includes impedance monitoring to determine the integrity of the voltage readings should the connection between probe and voltage meter be broken during operation (col. 4, lines 1-19). Since impedance is a measure of the resistance to current flow, this is an indirect method of providing a current measurement device for use in positioning the charging tube.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berger et al. (U.S. Pat. No. 5,835,524) in view of Eichberger et al. (U.S. Pat. No. 6,524,362), or Eichberger et al. (U.S. Pat. No. 6,524,362) in view of Berger et al. (U.S. Pat. No. 5,835,524) as applied to claims 16 and 29 and further in view of Roth (U.S. Pat. No. 5,641,336).

Berger et al. in view of Eichberger et al. teaches a continuous steelmaking process as discussed above.

Berger et al. in view of Eichberger does not teach continuously maintaining the slag layer in the furnace.

Roth discloses a process for draining overflow foam slag from a furnace (abstract and Fig. 1 below). Roth teaches that is especially important to control a foamed slag layer in electrical furnaces to prevent the slag from reaching and damaging furnace sealing components on the walls. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a slag overflow as taught by Roth to the furnace of Eichberger et

Art Unit: 1742

al. in view of Berger et al., to prevent the slag from reaching and damaging sealing components on the furnace walls as taught by Roth.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 16 and 32 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 5,835,524 in view of U.S. Pat. No. 6,524,362.

The instant claims 16 and 32 would have been obvious to one skilled in the art over claim 1 of Berger et al. (U.S. Pat. No. 5,835,524) in view Eichberger et al. (U.S. Pat. No. 6,524,362) for the same reason stated in the 103(a) rejection above.

Claims 16, 19, 20 and 32 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 and 3 of U.S. Patent No. 6,524,362 in view of U.S. Pat. No. 5,835,524

The instant claims 16, 19, 20 and 32 would have been obvious to one skilled in the art over claims 1 and 3 of Eichberger et al. (U.S. Pat. No. 6,524,362) in view of Berger et al. (U.S. Pat. No. 5,835,524) for the same reason stated in the 103(a) rejection above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571-272-3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ROY KING 
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700